



March 19, 2008

Via Electronic Filing

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, SW, TW – A325
Washington, DC 20554

Re: WT Docket No. 07-195 – Notification of Oral Ex Parte Presentation

Dear Ms. Dortch:

On March 18, 2008, Dr. Paul J. Kolodzy of Kolodzy Consulting and the undersigned met with Joel Taubenblatt, Marty Liebman, Patrick Forster, Jamison Prime, John Spencer, Ahmed Lahjouji, Peter Daronco, Paul Malmud, Brent Greenfield and Stephen Zak from the Wireless Telecommunications Bureau and Office of Engineering and Technology.

The enclosed materials were distributed to the meeting participants and reflect the nature of the conversation that occurred. In sum, we advocated for the adoption of service rules that will promote increased and timely broadband deployment and promote the interest of consumers.

Pursuant to Section 1.1206(b) of the Commission rules, an electronic copy of this letter is being filed. Please let me know if you have any questions regarding this submission.

Sincerely,

A handwritten signature in black ink, appearing to read 'Uzoma Onyeije', with a long horizontal stroke extending to the right.

Uzoma Onyeije

cc: Mr. Joel Taubenblatt, Mr. Marty Liebman, Mr. Patrick Forster, Mr. Jamison Prime, Mr. John Spencer, Mr. Ahmed Lahjouji, Mr. Peter Daronco, Mr. Paul Malmud, Mr. Brent Greenfield and Mr. Stephen Zak

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2000 North 14th Street • Suite 600 • Arlington, VA 22201

OFFICE 703.894.9500 FAX 703.894.9501

A Quick Summary of the AWS-3 Rulemaking WT Docket 07-195

A review of the record in the 2155-2175 MHz band leads to three key conclusions.

➤ **The record overwhelmingly supports exclusive licensing for the band.**

- Parties seeking unlicensed use have failed to address whether there is a need for additional unlicensed allocations, whether such uses would be technically viable, or how such a scheme would fund the transition of incumbent licensees.
- Rather than undoing years of allocation and relocation decisions by mandating unlicensed use, the Commission should swiftly move forward with licensing of the band.

➤ **Technical rules for the band should be technologically neutral and flexible.**

- Rules that are technically neutral and flexible are consistent with FCC practice and policy. For example, carriers have been afforded unlimited flexibility in the 700 MHz band including unpaired use at the licensee's discretion. Historically, the Commission has correctly developed rules to promote cooperation between licensees (particularly where there is a mutual desire to avoid harmful interference). Parties that are calling for a "downlink only" regime in AWS-3 are seeking a windfall for AWS-1 licensees and are looking to limit new entry for broadband competition.
- Incumbent licensees that oppose full flexibility and technological neutrality in AWS-3 are reversing course on their past advocacy for technical flexibility and neutrality as evidenced in their 700 MHz comments. For example, Verizon's advocacy for a "downlink only" use of the band is incontrovertibly inconsistent with its call for full technical flexibility in 700 MHz where both paired and unpaired use of spectrum is permitted without any guard bands being imposed.
- Incumbent licensees that oppose flexibility and neutrality are also reversing course on the definition of the FCC's "harmful interference" standard and ignore the use of accepted mitigation techniques for abating potential interference. T-Mobile and Verizon, for example, depart from their prior comments supporting a probabilistic examination of harmful interference issues (see H Block comments) and apply worst case analysis with no mitigation as a basis for determining service rules.

➤ **FCC should affirmatively promote the public interest in AWS-3.**

- The Commission has received overwhelming support for Public Interest Obligations to be included in the service rules for AWS-3 including:
 - the provision of free broadband service;
 - the filtering of indecent content on free broadband network;
 - open access/ wholesale requirements;
 - aggressive and enforceable build-out requirements;
 - spectrum aggregation limits and spectrum holding periods.
- Opposition to Public Interest Obligations come from carriers without any specific analysis or documentation of the cost benefit tradeoffs associated with the possible increase in consumer welfare from including the public interest obligations.
- The record has unrefuted economic analysis supporting the consumer surplus that would be created from applying the Public Interest Obligations on the AWS-3 band.

Proposed Rules for the 2155-2175 MHz Spectrum Band

Licensing Scheme

Licensed

- Aircell
- ArrayComm
- AT&T
- BWP
- Consumer Electronics Association
- County Executives of America
- CTIA
- Ericsson Inc
- Family Research Council
- HEWAC/College Parents
- ICO
- iKeepSafe
- Intel
- Leap Wireless
- M2Z
- MAP, Free Press, Public Knowledge & New America Foundation
- MetroPCS
- Minority Media Telecommunications Council/Rainbow Push Coalition
- National PTA
- NATOA
- NTCA
- Qualcomm
- Simon Wilkie
- Sprint Nextel
- TDS/US Cellular
- TerreStar
- Vermont Telecom Authority
- WCA

Unlicensed

- NetFree
- Nextwave
- Tropos

Technical Rules

Flexible Use

- ArrayComm
- BWP
- College Parents/HEWAC
- County Executives of America
- CTIA
- ICO
- iKeepSafe
- Intel
- M2Z
- MAP, Free Press, Public Knowledge & New America Foundation
- Minority Media Telecommunications Council/Rainbow Push Coalition
- Motorola
- National PTA
- Qualcomm
- Sprint Nextel
- WCA

Command & Control

- Aircell
- AT&T
- Ericsson Inc.
- Leap Wireless
- Terrestar
- T-Mobile
- Verizon Wireless

Public Interest Obligations

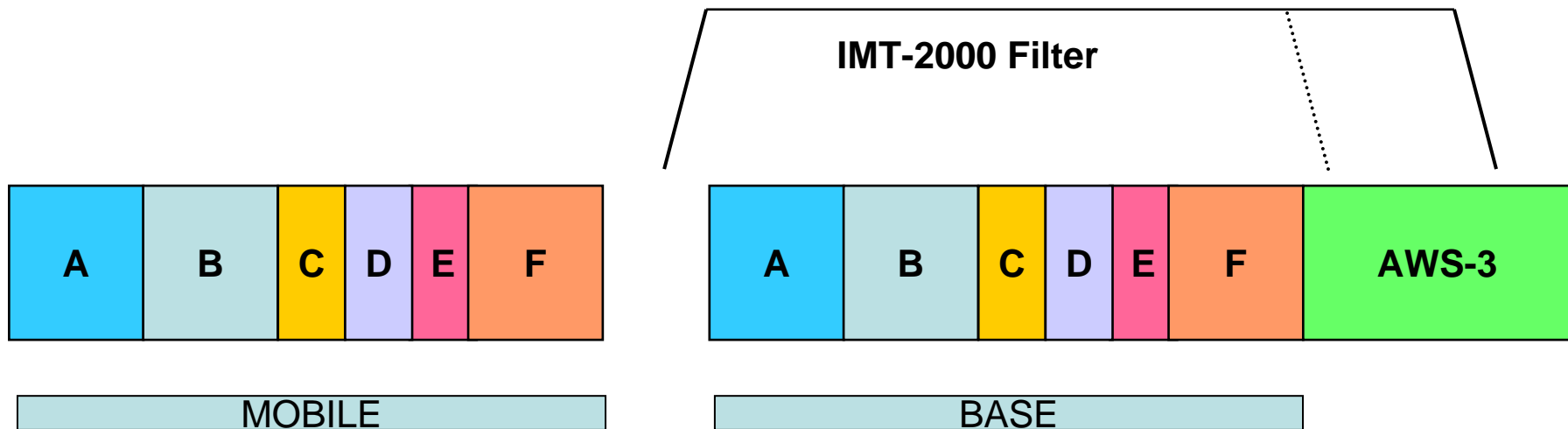
Specific & Enforceable

- BWP
- Coalition for Free Broadband
- College Parents/HEWAC
- County Executives of America
- Electronic Retailing Association
- iKeepSafe
- Lee Yancey
- M2Z
- MAP, Free Press, Public Knowledge and New America Foundation
- Minority Media Telecommunications Council/ Rainbow Push Coalition
- National PTA
- NATOA
- Vermont Telecomm Authority

Oppose Detailed Commitments

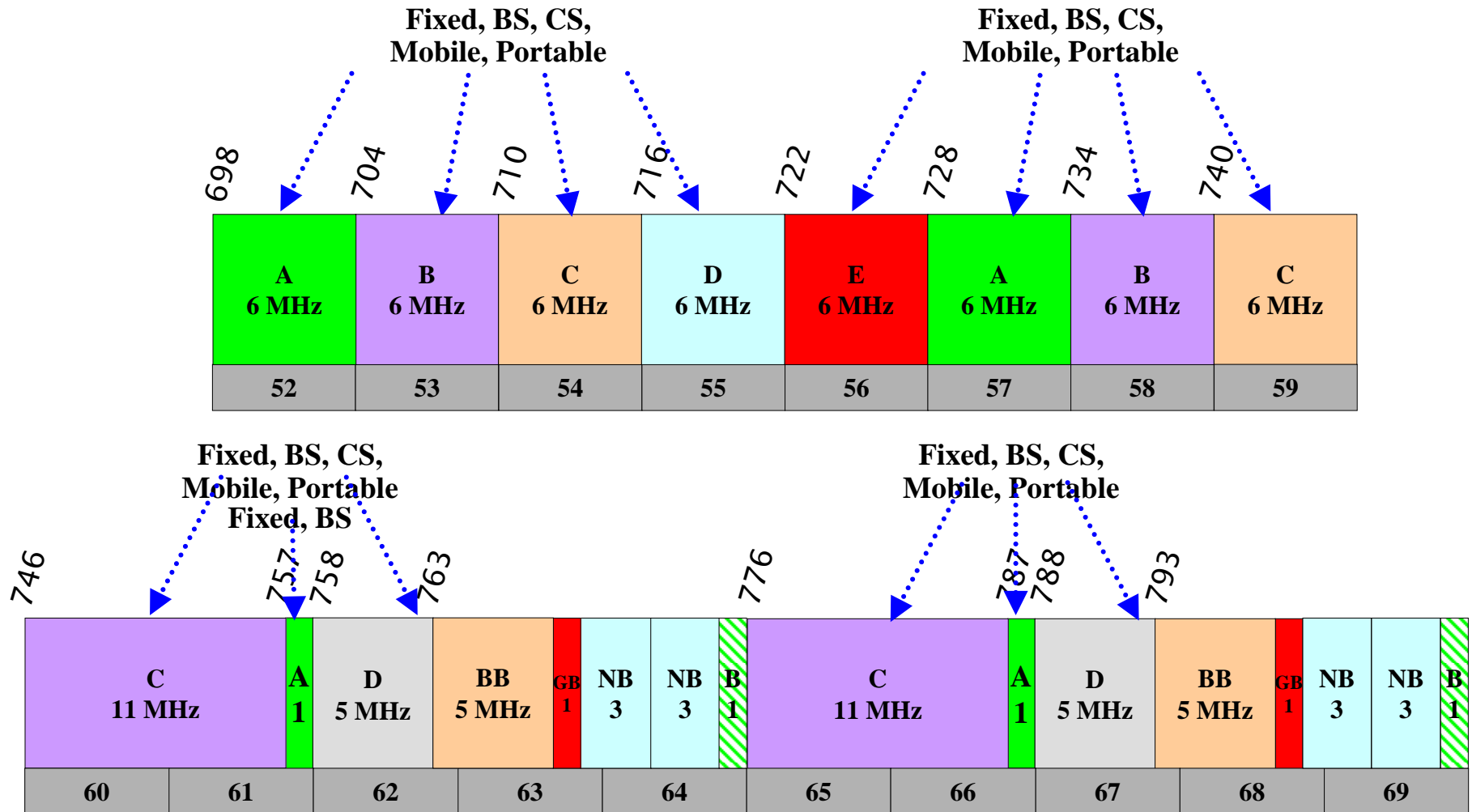
- AT&T
- Consumer Electronics Association
- CTIA
- Intel
- Leap Wireless
- Metro PCS
- Sprint Nextel
- TDS/ US Cellular
- TerreStar
- WCA

AWS Band Plan



700 MHz Band Plan

Part 24 Rules



BB - Public Safety Broadband, NB - Public Safety NarrowBand,
GB - Guard Band

Document: WiMAX Forum Mobility Certification Profile Submission Template 01-10-06-doc

Working Group	WiMax forum Technical working Group	
Title	TDD certification profile for the 700 MHz band (Release 1.0)	
Number		
Source(s)	<p>Philippe Sehier Alcatel Lucent</p> <p>Eugene Crozier SR Telecom</p> <p>Ambroise Popper Sequans</p> <p>Peter_Stewart PMC-Sierra</p>	<p>Voice: +33 1 30 77 18 94 Fax: +33 1 30 77 24 74 philippe.Sehier@alcatel-lucent.fr</p> <p>Voice: +1 425 881 7313 Fax: 514 956 4425 eugene_crozier@srtelecom.com</p> <p>Voice: +1 (650) 862 0845 Fax: +1 ambroise@sequans.com</p> <p>Voice : +1 604-415-6736 Peter_Stewart@pmc-sierra.com</p>
Membership	Are proposing organizations listed above WiMAX Forum members? Yes[X] No[]	
Abstract	We are proposing an additional system profile in the sub 1 GHz frequency bands. The first frequency band to be 700 MHz.	
Notice	This document is a proposal by the authors submitted to WiMAX Forum as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.	
Reference	<p>- [IEEE Standard. 802.16e] [section x.y.z]</p> <p>- Requirements and Recommendations for WiMAX Forum Mobility Profiles dated</p>	
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Other	
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1 Introduction

The SPWG Requirements and Recommendations for Rel 1.x WiMAX Forum™ Air Interface ballot version 1.1 includes spectrum requirements for the 700MHz bands for TDD and FDD duplexing modes.

It has been agreed that the FDD certification profiles are defined within the release 1.x project, while the new TDD profiles should be kept in release 1.0. This is agreed under the assumption that the new profiles do not require any adaptation of the existing R1.0 system profile and PICS.

This documents introduces new TDD profiles in the 700MHz band, taking into account requirements and allocation scenarios from all regions of the world.

2 Profile information

Table 1 provides the SPWG spectrum requirements for TDD systems. Only profile 5a is covered in this profile submission form.

Band Class Index	Frequency Range (GHz)	Mandatory Channel size (MHz)	Optional Channel size (MHz)	Channel Raster (kHz)
1a	2.300 - 2.400	5 & 10 & 8.75		250
2a	2.305 – 2.320 & 2.345 – 2.360	3.5 & 5 & 10		250
3a	2.496 – 2.690	5 & 10,	20	250
4a	3.300 – 3.400	5 & 10	7	250
5a	3.300 – 3.800	5 & 10	7	250
6a	0.698 - 0.806	5 & 10		250

Table 1 : Common Spectrum Requirements for TDD Systems

Requirements for Band Class 6a:

- Frequency Range of 0.698 – 806 GHz SHALL be supported
- Rel 1.x profile set for the MS SHALL support 5 & 10 MHz channel sizes.
- The frequency raster SHALL allow 250 kHz increments in center frequency.

2.1 Target Regions

Outcome of WRC'07

A new primary mobile allocation was made in the band **790-862 MHz in region 1**, effective from June 2015. However, in many countries the mobile allocation is, via footnotes, already effective

A new primary mobile allocation was made in **region 2** in the band **698-806 MHz**

The identification for IMT of the band **790-862 MHz** is valid for **region 3** countries where this band is already allocated to mobile services

In addition a specific identification of the band **698-790 MHz** has been made for some **region 3** countries (including India, china, India, Japan, Korea, Singapore)

Those parts of the band 698-960 MHz in region 2 and 790-960 MHz in region 1 and 3 which are allocated to the mobile service on a primary basis are identified for IMT

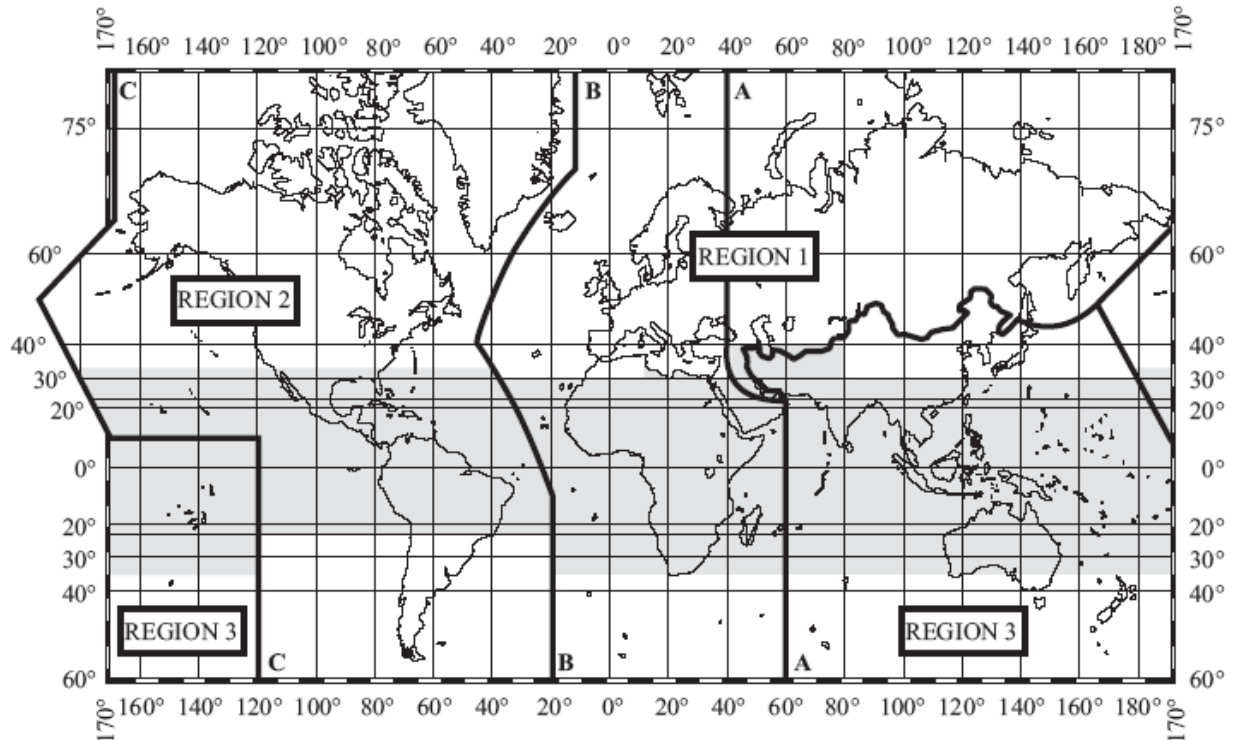


Figure 1 : Regions definition

The following additional information on status in different countries is available :

- Canada:
 - Available spectrum in rural areas can be allocated on a first come/ first serve basis
- India
 - India Government is carrying a study on the subject
 - No time line set up right now for the decision
 - It is likely that India will follow the FCC band plan
- Germany
 - Landers have authority on the spectrum usage

- On going proposal for a trial based on demonstrator
- France
 - CCR study group to make proposal for ARCEP
 - Request of 150 MHz for Mobile BB

2.2 FCC status

Currently, FCC is the most advanced in the definition of spectrum organization and allocation, and will therefore be used as the main guideline for the definition of the profile

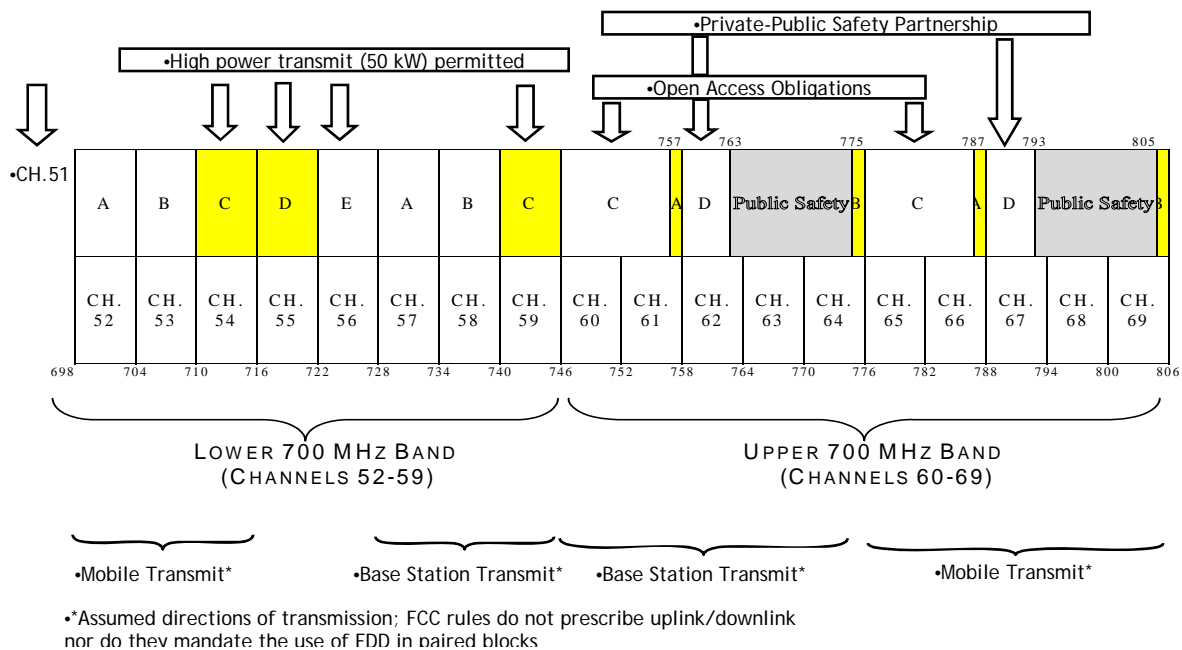


Figure 2: FCC 700 MHz spectrum Allocation

The FCC has portioned the band into “lower” and “upper” 700MHz bands as represented in Figure 2. the lower band (698-746 MHz) consists of eight 6 MHz blocks, 6 of which are paired blocks, and two unpaired blocks (blocks D and E) that are designed for aloha Broadcast (block D), while block E is not auctioned yet.

Since they consist of two paired channels, all but two of the licenses allocated in the US lower and upper 700 MHz band will support either Frequency Division Duplex (FDD) or Time Division Duplex (TDD). Further, since the FCC rules allow for flexible use in this band, operators holding these licenses have an additional degree of deployment flexibility.

Key services rules are:

- Open Access
 - Upper 700 MHz C Block Licensee
 - “will be required to allow customers, device manufacturers, third-party application developers, and others to use any device or application of their choice on their networks in this band, subject to certain conditions”

- Private-Public Safety Partnership

“Commercial (D Block) licensee will build out a nationwide, interoperable broadband network for the use of public safety.”

“Under the Partnership, the Public Safety Broadband Licensee will have priority access to the commercial spectrum in times of emergency, and the commercial licensee will have preemptible, secondary access to the public safety broadband spectrum.”

Private and Public Safety partners will negotiate a network sharing agreement. FCC will arbitrate if no accord reached within six months

- Base Station Power Limits

- Rules permit 50 kW base station power in lower band D, E, and incumbent C Block licenses

- Performance (Build-Out) Requirements

- Geographic based benchmarks for Cellular Market Area (CMA) and Economic Area (EA) licenses : 35% in four years; 70% in ten years
- Population based benchmarks for Regional Economic Area Grouping (REAG) licenses : 40% in four years; 75% in ten years
- If interim benchmark missed, license term reduced from 10 to 8 years
- If final benchmark not met, FCC will reclaim un-served portions

Key concern in lower 700 MHz band is interference from high power broadcast transmissions in D (MediaFLO), E, and incumbent C Blocks; also from broadcast channel 51

- Internal guard bands may be required in blocks adjacent to high power transmissions.
- In the upper band, there is the potential for interference between commercial and narrowband public safety operations

Interference between mobiles is a possibility that requires further study. Terminal (mobile) manufacturers have expressed concern over the available duplex spacing and its impact on filter requirements

2.3 Target Bands

It is considered that allocating only the unpaired blocks C and D in the lower band would not result in a profitable business case.

Additionally, high power emissions authorized in some parts of the lower band would cause significant interference problems in case this band is shared with high power emissions.

For these reasons, it is proposed to define 2 TDD profiles, each covering the whole lower/higher band :

- 5A1 : whole lower band (698-746 MHz)
- 5A2 : whole upper band (746-806 MHz)

[this has to be considered as an initial proposal. Subdivision and reduction of these 2 profiles will probably have to be decided, based on technological constraints, and spectrum availability in various countries]

Future profiles to cover the band up to 862 MHz will have to be included when the visibility on availability will be better.

2.4 Regulations

TBD

2.5 Applications

Refer to the MWG paper under development

Note : Marketing working group is currently developing a white paper covering market volume, usage scenarios, ecosystem and business models. This paper should provide all the inputs required for this certification profile proposal.

2.6 Target Markets

Refer to the MWG paper under development

2.7 Market Size

Refer to the MWG paper under development

2.8 IP rights

N/A

3 Technical Description

3.1 Top Level Parameters

Item	Description	Value
1	Frequency band	5A1 :698-746 MHz 5A2 : 746-806 MHz
2	Channel bandwidth	5 and 10 MHz
3	Duplexing mode	TDD

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of)	
)	
Service Rules for Advanced Wireless Services)	WT 07-195
in the in the 2155-21755 MHz Band)	
)	

**COMMENTS OF FREE PRESS, MEDIA ACCESS PROJECT, NEW AMERICA
FOUNDATION, AND PUBLIC KNOWLEDGE**

Marvin Ammori
Ben Scott
Free Press
501 Third Street NW, Suite 875
Washington, DC 20001
202-265-1490

December 14, 2007

Table of Contents

I. The Commission Should Act To Promote Increased Broadband Access and Broadband Competition	2
II. Our Technical Analysis Finds That the Band Can Support Various Models	4
III. The FCC Should Adopt a Scoring Auction Based on Public Interest Factors.....	6
A. The Commission Should Insist on Openness Principles to Ensure Increased Broadband Access.....	8
B. Technical Feasibility and Economic Practicality of the Applicant’s Plan.....	11
C. The Commission Should Judge the Proposal’s Foreseeable Contribution to Increasing Broadband Access	12
IV. Conclusion	13
Appendix: CTC Technical Assessment	1

Summary

The Commission can best serve the public interest and promote broadband delivery through assigning the AWS-3 band through a scoring auction. This auction should be based on three public interest criteria: adoption of openness principles, technical and economic feasibility, and rapid broadband build-out and acceptable data rates.

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**COMMENTS OF FREE PRESS, MEDIA ACCESS PROJECT, NEW AMERICA
FOUNDATION, AND PUBLIC KNOWLEDGE**

Free Press, Media Access Project, New America Foundation, and Public Knowledge (“Commenters”) submit these comments in response to the Notice in the above docketed proceeding. Commenters applaud the Federal Communications Commission for launching this proceeding with the aim to make “further progress toward providing all Americans with universal, affordable access to broadband technology”¹ at a time when the nation continues to fall farther behind our global competitors in terms of broadband choice, deployment, and adoption.²

Commenters have been actively engaged in spectrum proceedings before the Commission. To foster greater access to advanced services, we have consistently urged the Commission to adopt policies that would promote competition—among broadband network providers, content providers, applications providers, and device manufacturers. Competition will promote broadband access, which promotes consumer choice and technological and economic innovation, as well as civic participation and engagement made possible through internet technologies.

¹ Notice of Proposed Rulemaking, Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band, WT 07-195, 22 FCC Rcd. 17,035, ¶4 rel. Sept. 19, 2007 (“AWS-3 Notice”).

Commenters here reiterate openness principles that should guide Commission policy. We then provide an analysis of the technical possibilities and constraints in this band. In light of the principles and the technical constraints, we propose that the Commission assign licenses in the band based on three factors; first, an applicant's willingness to adhere to the proposed openness principles; second, the Commission's consideration of the technical feasibility and economic practicality of the applicant's plan; and third, the applicant's foreseeable contribution to increasing broadband access. Although we retain our preference for and commitment to unlicensed allocations, the technical characteristics of this band lead us to conclude that a licensed approach, subject to openness conditions, would likely better serve the public interest.

I. The Commission Should Act To Promote Increased Broadband Access and Broadband Competition

The Commission should act in this proceeding promote its broadband policy goals of increasing access and openness.³ The United States is falling behind in broadband penetration, adoption, speeds, and value. Broadband service is unavailable to roughly 10% households.⁴ Over 50% of households do not subscribe to broadband. An OECD study places the US 15th among 30 OECD member nations in broadband adoption; a broader ITU study places the US at 16th.⁵ The trends lines are all negative; we are falling

² See, e.g., S. Derek Turner, *Broadband Reality Check II*, Free Press, Consumers Union, and Consumer Federation of America, August 2006, *available at* <http://www.freepress.net/docs/bbrc2-final.pdf>.

³ Cf. Federal Communications Commission, Policy Statement, Aug. 5, 2005, p. 3, http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.pdf (adopting policies to promote the interconnected nature of the internet and promote broadband deployment).

⁴ *Broadband Deployment is Extensive throughout the United States, but it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas*, Government Accountability Office, Report to Congressional Committees, GAO-06- 426, May 2006.

⁵ Organization for Economic Cooperation and Development (OECD), *OECD Broadband Statistics to December 2006*, <http://www.oecd.org/sti/ict/broadband>; http://www.itu.int/ITU-D/ict/statistics/at_glance/top20_broad_2005.html.

behind faster, as our growth rate from 2005 to 2006 is 20th in world.⁶ Our speeds are far behind those available in countries like Japan and France, where connections of 30 to 100 Mbps in both directions are affordable.⁷ In the US, these speeds are generally unavailable. Most US connections are less than 2.5 Mbps.⁸ High-prices are often cited as a reason why US households do not subscribe.⁹ Other countries provide far greater value for the price, providing far faster connections for more affordable prices.

These figures point to deeper issues. Because high-speed internet supports economic development, consumer choice, opportunities for small businesses, healthcare, education, and workplace productivity, the nation's "broadband problem" results in foregone benefits to citizens and harms our global competitive in the industries of the 21st Century.¹⁰ Studies indicate that universal broadband would result in \$500 billion/year and 1.2 million new jobs added to the economic.¹¹

The FCC has acted and, by Congress's command, must continue to act to address this broadband problem. The 1996 Telecommunications Act requires the FCC to

⁶ Organization for Economic Cooperation and Development, "OECD Broadband Statistics to December 2006", <http://www.oecd.org/sti/ict/broadband>.

⁷ "Neuf Offers 50 Mbps in Paris for 30 EUR per month," MuniWireless, 7 March 2007, <http://www.muniwireless.com/article/articleview/5771/1/2/>; Grant Gross, "U.S. customers pay considerably more than the Japanese for bandwidth," IDG, 4 April 2007, http://www.infoworld.com/archives/emailPrint.jsp?R=printThis&A=/article/07/04/04/HNjapbroadband_1.html.

⁸ "High-Speed Services for Internet Access as of June 30, 2006," Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission.

⁹ Extrapolated from "High-Speed Services for Internet Access as of June 30, 2006," Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission.; calculated assuming one line per household, based on July 1 2006 Census household estimates; S. Derek Turner, *Broadband Reality Check II*, Free Press, Consumers Union, and Consumer Federation of America, August 2006, available at <http://www.freepress.net/docs/bbrc2-final.pdf>.

¹⁰ The Telecommunications Industry Association, "The Economic and Social Benefits of Broadband Deployment," October 2003.

¹¹ Robert W. Crandall and Charles L. Jackson, "The \$500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access," Criterion Economics, July 2001; Robert W. Crandall, Charles L. Jackson, and Hal J. Singer, "The Effect of Ubiquitous Broadband Adoption on Investment, Jobs, and the U.S. Economy," Criterion Economics, September 2000.

“encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans.”¹² And Congress has dictated that the FCC must promote services placing choice in the hands of consumers, not network gatekeepers. The Act specifies explicitly that the policy of the United States is “to encourage the development of technologies which maximize user control over what information is received by individuals, families, and schools who use the Internet and other interactive computer services.”¹³ Commenters have consistently argued that increased competition is central to spurring greater broadband access. As a result, we have advocated for openness principles that we advocate for in this proceeding, as detailed below.

II. Our Technical Analysis Finds That the Band Can Support Various Models

The AWS-3 band has certain technical capabilities outlined in the attached technical assessment by the Columbia Telecommunications Corp. (“CTC”). CTC found that AWS-3 spectrum can effectively perform, with certain limitations, in both an unlicensed scenario and in a licensed scenario embracing open service and open network rules (or what the assessment calls a “base-station/coordinated” scenario).

The AWS-3 band, as the Commission knows, has several technical limitations. First, the available bandwidth is limited, as the band consists of only 20 MHz. Second, uses at the edges of the AWS-3 band are limited by the band’s proximity to AWS-1 and AWS-2 bands. Third, the propagation characteristics of the AWS-3 band limit its ability to penetrate buildings and other obstructions, compared to bands in lower frequencies.

¹² 47 U.S.C. § 157

¹³ 47 U.S.C. § 230(b)(3).

The AWS-3 band could be used for unlicensed uses, but is likely most suited for short-range networking of technologies such as Bluetooth and RFID, rather than WiFi-like technologies. On its own, the band could likely not support the same speeds and uses supported by the unlicensed spectrum in the 2.4 GHz band used for WiFi and other technologies. The AWS-3 band has only 25% the bandwidth of the 2.4 GHz unlicensed band. Further, the edges of the AWS-3 bandwidth are further limited by proximity to the AWS-1 and AWS-2 and the AWS-3 band could not support WiFi technologies without WiFi making some accommodations, such as using narrower channels, not using multiple channels, and attenuating power at the band's edges. As a result, short-range networking technologies are probably most suited for an unlicensed AWS-3 band. This could relieve some of the congestion in the 2.4 GHz band, as short-range networking devices could migrate to the AWS-3 band. Nonetheless, unlicensed uses enable innovation and creativity that cannot easily be predicted, so an unlicensed assignment could lead to unforeseen technologies and advances.

Second, coordinated uses are technically feasible. With coordinated operation, a licensee could use a base-station arrangement to serve users over several kilometers and deliver speeds up to a few hundred Kbps, which are comparable to the speeds available with existing 3G technologies such as 1xEV-DO or HSDPA. The band's utility would be comparable to networks in existing PCS spectrum or of any single AWS-1 licensee. Coordinated uses could also include offering shared roaming space to multiple carriers. Finally, a licensee could operate an open platform, providing capacity and network operations to competing operators and offered devices.

This band necessitates higher capital costs than 3G services operating over greater bandwidth, as more sophisticated technology would be necessary for similar performance. As a result, with only the AWS-3 band, a licensee would need considerable investment to compete with 3G incumbents, though perhaps with less of a cost disadvantage in rural areas. A company with access to other bands to supplement the AWS-3 band could be at less of a technical disadvantage.

III. The FCC Should Adopt a Scoring Auction Based on Public Interest Factors

The Commission should adopt a scoring auction weighing three public interest factors. The Commission asks whether it should adopt a scoring auction and how a scoring auction should be implemented.¹⁴ A scoring auction would rate auction bids not just on price but also based on a host of “performance dimensions” such as likely coverage commitments.¹⁵ The Commission should score the auction based on three factors that we discuss in the next section: proposed openness principles; technical feasibility and economic practicality; and contribution to broadband delivery. The Commission should weigh, we argue, these factors in scoring the auction, without a dollar-amount component. The Commission must maximize the public interest, not auction revenues,¹⁶ and weighing these three factors would better serve the public interest than merely a price auction. An auction solely on price can impose huge debt burdens on new entrants, disfavor business models requiring steady growth rather than immediate cash flow, and thereby foreclose innovative uses.¹⁷ It could also permit wireline incumbents to bid ways to block entry or buy spectrum to warehouse it, such as

¹⁴ AWS-3 Notice at ¶126.

¹⁵ *Id.*

¹⁶ 47 USC §§309(j)(7)(A)-(B).

SpectrumCo's apparent strategy. Since the FCC must generally ensure the "recovery for the public of a portion of the value of the public spectrum resource made available for commercial use and avoidance of unjust enrichment,"¹⁸ the Commission should require a spectrum fee of 5% of gross revenues.

If the Commission chooses not to adopt a scoring auction, it should avoid auctioning altogether and not accept mutually exclusive applications. Congress has not relieved the FCC "of the obligation in the public interest to continue to use engineering solutions, negotiation, threshold qualifications, service regulations, and other means in order to avoid mutual exclusivity in application and licensing proceedings."¹⁹ Here, the Commission could adopt strict threshold qualifications and service regulations, such as the three public interest requirements proposed herein, to limit potential bidders. The bidders may likely be limited, through such qualifications and regulations, to only one viable candidate. (The FCC should insist on a 5% spectrum fee in this case as well.) If there is more than one viable candidate under these qualifications and regulations, the Commission can then auction, perhaps with a scoring auction including price, a spectrum fee, and other factors.

As the Commission suggests, if it assigns licenses in the band by a scoring auction based on performance commitments, it must "enforce performance commitments, ensure sincere bidding," and safeguard the auction's integrity.²⁰ The Commission should adopt considerable substantial service requirements with mid-license performance

¹⁷ See AWS-3 Notice, at n. 181 (citing PISC Aug. 28, 2007 *M2Z Ex Parte*, at 7); see also n. 180 (listing applicants offering 5% in fees).

¹⁸ See 47 U.S.C. § 309j(3)(C).

¹⁹ See 47 U.S.C. § 309j(6)(E).

²⁰ AWS-3 Notice, at ¶126.

requirements, and a keep-what-you-use condition.²¹ It should also eliminate renewal expectancy and permit competing applications if the applicant misses any of its commitments by renewal.

To best serve the public interest, the Commission should assign AWS-3 licenses to an entity that will best use the band to promote access to advanced telecommunications. The Commission should score three criteria: first, an applicant's willingness to adhere to the proposed openness principles; second, the Commission's consideration of the technical feasibility and economic practicality of the applicant's plan; and third, the applicant's foreseeable contribution to increasing broadband access.

A. The Commission Should Insist on Openness Principles to Ensure Increased Broadband Access

The Commission should insist, first, on four openness principles that ensure competitive markets in broadband provision. Broadband delivery entails services that do not have gatekeepers controlling the applications, services, content, and devices. To increase access to open broadband networks, the Commission should adopt openness rules that promote competition in the provision of broadband network access, applications, and devices. Filing in both the *700 Mhz Proceeding*²² and the *M2Z Networks Proceeding*,²³ Commenters have consistently argued for ways to ensure a “third pipe” to the home through wireless offerings. A third pipe should serve as an independent competitor to wireline incumbents, who generally own the incumbent companies providing wireless service (such as Verizon controlling Verizon Wireless,

²¹ AWS-3 Notice, at ¶111.

²² See, e.g., *Ex Parte* Comments of Public Interest Spectrum Coalition, filed April 5, 2007; Comments of Public Interest Spectrum Coalition, filed May 23, 2007; *Ex Parte* Reply Comments of Public Interest Spectrum Coalition, filed July 6, 2007, In the Matter of Service Rules for the 698-746, 747-762, and 777-792 MHz Bands, WT Dkt Nos. 06-150 et al.

Comcast controlling SpectrumCo, and AT&T controlling AT&T Wireless). These incumbents have not used their spectral assets to provide internet service that competes with the two main pipes (DSL and cable), but rather have provided merely complimentary wireless services.²⁴ Through strategic behavior, warehousing, and blocking competitors at auctions, incumbents have foreclosed competition from wireless network provision.²⁵ Likely because of uncompetitive markets, the incumbents who control wireline and wireless broadband have also been able to stifle competition among providers of broadband internet service, applications (such as VOIP and others), and content.²⁶

Whether or not the spectrum available in this band could support a third pipe without being incorporated with other spectral assets, the Commission should adopt rules that maximize the likelihood of the band supporting network competition, as well as competition in among providers of service, applications, and content. One option for effecting such openness and competition would be unlicensed uses. Generally, Commenters' first-preference is for unlicensed uses. In this case, however, based on the technical attributes of this band, unlicensed uses may not be the most effective use. Though the nature of unlicensed uses are extremely difficult to predict, CTC's technical assessment suggests that unlicensed uses likely will not support WiFi-like or other broadband-like technologies. So unlicensed uses in this band currently seem unlikely to

²³ See, e.g., *Ex Parte* Written Comments of the Public Interest Spectrum Coalition, In the Matter of M2Z Networks, Inc., WT Dkt Nos. 07-16 et al.; filed Aug. 28, 2007.

²⁴ See, e.g., PISC Comments, May 23, 2007, at 6-15 (and sources therein).

²⁵ See *id.* at 6-15; 30-34.

²⁶ See, e.g., *id.* at 6-7; Tim Wu, Wireless Network Neutrality, Feb. 2007, available at http://www.newamerica.net/files/WorkingPaper17_WirelessNetNeutrality_Wu.pdf.

inject considerable competition in network provision. As a result, Commenters would favor a licensed approach subject to openness mandates.

Under a licensed approach, the Commission should judge applicants on their willingness to adopt four openness mandates proposed by Commenters, as well as by certain industry commenters.²⁷

1. Open applications (or network neutrality) requirements, such as those adopted in the *AT&T/Bell South Merger Order*, should ensure no discrimination against content or applications.²⁸
2. Open-devices rules, such as those adopted in the seminal *Carterfone* decision and by this Commission regarding the “C Block” in the 700 MHz Order,²⁹ should apply to this band.
3. Open service rules, which ensure that a third party service provider can acquire wireless service on a wholesale basis, at commercially reasonable rates, terms and conditions, should apply.
4. Open network rules, ensuring that third parties like Internet service providers can interconnect at any technically feasible point in the licensee’s network.

²⁷ See, e.g., Google Ex Parte Filing, Service Rules for the 690-746, 747-762, and 777-792 MHz Bands, WC Dkt Nos. 06-150 et al., July 9, 2007; PISC filings cited in notes 22-23. The language in the text tracks Google’s language. In the previous proceeding regarding this band, we argued that proposals were in the public interest to the extent they conformed to these principles, but were not to the extent they did not—for example, with deviations from network neutrality through content-filtering and from open devices. *Ex Parte* Written Comments of the Public Interest Spectrum Coalition, In the Matter of M2Z Networks, Inc., WT Dkt Nos. 07-16 et al.; filed Aug. 28, 2007 at 6-7.

²⁸ 22 FCC Rcd at 5814-15.

²⁹ See *Carterfone*, 13 FCC 2d 420 (1968).

Adopting these mandates would best serve the public interest because the mandates could ensure the entry of, and a level field for, many competing network providers, service providers, applications providers, and device manufacturers.³⁰

B. Technical Feasibility and Economic Practicality of the Applicant's Plan

Next, the Commission should evaluate and score a proposal's technical and economic practicality.

Technically, the Commission should evaluate the applicant's plans to ensure that the applicant's promised speeds, build-out timetable, and services are technically feasible. CTC's assessment suggests that an AWS-3 licensee can offer 3G services through an open platform service. Previous applicants for this band have promised national broadband service. The Commission should ensure such technical promises are likely accurate.

This technical analysis should help determine the *geographic and bandwidth size* of licenses in the band plan.³¹ If an applicant can use the entire 20 MHz nationally to provide a feasible broadband service, as some applicants have previously claimed, the Commission should accept such a national 20MHz license, subject to the openness principles. If the Commission does not accept the technical feasibility of a national 20MHz operation, the Commission should adopt a band plan with a mix of regional and local licenses, subject to the openness principles. Smaller licenses would enable new entrants, local entrants, experimentation with business plans to meet local needs, and likely easier access to capital to build out in remote areas.

³⁰ See sources cited in 22-23; *see also* Columbia Telecommunications Corporation, *An Engineering Assessment of Select Technical Issues Raised in the 700 MHz Proceeding*, May 2007, <http://www.ctcnet.us/700%20band%20issues%20jsh.pdf>.

³¹ See, e.g., AWS-3 Notice, at ¶38.

The Commission should also evaluate the economic practicality of the applicant's proposed business plan, especially if the Commission adopts a spectrum fee.

Commenters have already made the case for the economic practicality of an open platforms licensee, based on existing successful business models and apparent pent-up demand.³² CTC concludes that a new entrant in this band can technically compete with 3G service, though with greater equipment expense. If the entrant need not take on the debt to purchase the spectrum at auction, this greater expense can be managed.³³

C. The Commission Should Judge the Proposal's Foreseeable Contribution to Increasing Broadband Access

The AWS-3 band can best serve the public interest by helping to promote robust competition in broadband delivery. If an applicant will adhere to the openness mandates and provides a technically and economically feasible plan, then the Commission should choose the applicant that can most quickly and widely expand broadband service.

As a result, the Commission should ensure that the licensees can provide sufficient minimal data rates.³⁴ The Commission should seek licensees with the highest technically feasible data rates that are economically practical, with an emphasis on those with symmetrical connections.³⁵

³² See, e.g., *Ex Parte* Reply Comments of Public Interest Spectrum Coalition, In the Matter of Service Rules for the 698-746, 747-762, and 777-792 MHz Bands, WT Dkt Nos. 06-150 et al., filed July 6, 2007, at 5-9.

³³ Further, even if the spectrum were put to auction, a bidder could discount its bid accordingly, resulting in economically practical open platform service. Since the FCC is obligated to maximize public interest benefits and not auction revenue, this outcome is also acceptable. 47 USC §§309(j)(7)(A)-(B).

³⁴ AWS-3 Notice, at ¶87.

³⁵ We contest the Commission's apparent acceptance of increasingly asymmetric data flows. Data flows over the internet rely extensively, and increasingly, on uploading capabilities. See, e.g., Matter of the Petition of Free Press et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement, RM-____, WC Docket No. 07-52, Nov. 1, 2007. Moreover, Congress envisioned symmetrical broadband connections. See, e.g., Comments of Consumers Union, Consumer Federation of America, and Free Press, Inquiry Concerning the Deployment of Advanced Telecommunications Capability, GN Docket No. 07-45, filed May 16, 2007.

The Commission should favor licensing the band with *both uplink and downlink capabilities*.³⁶ Licensing for mere downlink capabilities would, as the Commission acknowledges, “inhibit new entry into his band by potential providers that may not be licensed to use other bands.”³⁷ The public interest would benefit from new entry.³⁸

Finally, the Commission should also adopt strict *build out* requirements, on a *geographic*, not population, basis, and by geography, not “counties” or another proxy.³⁹ If the Commission finds that a licensee can offer broadband service nationally with a national 20MHz license, the Commission should seek the greatest and most rapid build-out commitments, yet ensure their technical and practical feasibility. The build-out requirements for a national licensee should not be substantially less than those proposed by current applicants.⁴⁰

IV. Conclusion

To best serve the public interest and promote broadband delivery through assigning the AWS-3 band, the Commission should adopt a scoring auction centered on three public interest criteria: openness, feasibility, and rapid broadband build-out.

Respectfully Submitted

Marvin Ammori
Ben Scott
Free Press
501 Third Street NW, Suite 875

³⁶ AWS-3 Notice, at ¶¶14-20.

³⁷ AWS-3, at ¶21.

³⁸ Commenters can imagine a situation where downlink-only application would serve the public interest if it helped a competitor (without major DSL and cable holdings) to build a broadband service that could compete with DSL and cable offerings.

³⁹ Cf. AWS-3 Notice, at ¶¶111, 119.

⁴⁰ See, e.g., AWS-3 Notice, at ¶¶118, 121.

Washington, DC 20001
202-265-1490

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Appendix: CTC Technical Assessment



Columbia Telecommunications Corp • 10613 Concord Street • Kensington, MD 20815
301.933.1488 • www.CTCnet.us

A Brief Technical Assessment of Capabilities of AWS-3 Spectrum

Prepared for Free Press

December 2007

This assessment briefly addresses the technical capabilities of the spectrum designated by the FCC as AWS-3 (2155 to 2175 MHz). This assessment was prepared in December 2007 by Columbia Telecommunications Corporation (CTC) for Free Press. Per the request of Free Press, this assessment evaluates the capability of the AWS-3 spectrum band to effectively perform in both an unlicensed scenario and in a coordinated, base-station scenario.

This assessment concludes that the AWS-3 spectrum can effectively perform, with certain limitations, in both an unlicensed scenario and in a base-station/coordinated scenario. The capabilities of this spectrum will be limited by a number of key disadvantages flowing from the following factors:

1. The limited available bandwidth of 20 MHz
2. Proximity to the AWS-1 and AWS-2 bands, which further reduces the usable spectrum by limiting use of the spectrum edges to limit interference
3. The fundamental propagation characteristics of the spectrum at issue, which is less capable than other spectrum for penetration of buildings and other obstructions than spectrum below 1 GHz used by many incumbent wireless providers

A. Potential of AWS-3 Spectrum for Unlicensed Use

The AWS-3 spectrum holds some promise for unlicensed use, particularly for certain low-power applications and as part of a broader range of unlicensed spectrum bands used in a coordinated fashion through the use of smart radios.

Though it has potential in other areas, it is clear that the AWS-3 band by itself will not be capable of the same speeds and uses as is the existing unlicensed spectrum in the 2.4 GHz band that has so effectively been used for WiFi and many other unlicensed wireless technologies. AWS-3 is limited in capacity relative to the 2.4 GHz unlicensed band--at 20 MHz in size, AWS-3 contains approximately 25 percent of the capacity of the nearly 80 MHz of size in the 2.4 GHz band.

Indeed, AWS-3 has even less than 25 percent of the utility of the 2.4 GHz band with respect to broadband applications, for two primary reasons: first, the spectrum at the edges of the band abuts the AWS-1 and AWS-2 bands, raising the risk of interference—these edges must therefore be avoided or restricted to lower power.

Second, AWS-3 is not conducive to existing, cost-effective, unlicensed broadband technologies, such as WiFi, that have proven so successful and flexible in the 2.4 GHz band. WiFi, for example, requires a channel width that is slightly wider than the entire proposed AWS-3 band. Moreover, the 2.4 GHz WiFi band allows for more advanced versions of WiFi technology, such as 802.11n, that use multiple WiFi channels simultaneously to achieve higher speeds and greater range. In order to operate in AWS-3, the technologies that use WiFi would need to accommodate these requirements in the following ways: 1) using narrower channels (resulting in lower speeds than WiFi), 2) not using multiple channels (and thereby reducing options to avoid interference from other users) unless the channels are much narrower, and 3) engineering systems so that the power level at the edges of the band will not interfere with AWS-1 and AWS-2 (potentially resulting in higher costs and shorter range).

Given these limitations, it seems unlikely that AWS-3, if unlicensed, would be used in the same ways as unlicensed spectrum in the 2.4 GHz band. Rather, from a technical standpoint, this spectrum is more suitable to technologies that utilize narrower channels and lower power--or power that is adaptable depending on where it sits within the band. For example—unlicensed AWS-3

could effectively enable very short-range networking (either alone or in combination with other bands) of technologies comparable to Bluetooth, other personal area-networking technologies, and other short-range technologies like RFID. Under this scenario, some existing personal area-networking could migrate to unlicensed AWS-3 and thereby reduce congestion in the 2.4 GHz unlicensed band, freeing up that spectrum for longer-range broadband local area networking, such as WiFi and emerging technologies. These personal area-networking technologies would no longer compete with WiFi in their immediate area for 2.4 GHz spectrum.⁴¹

Of course, unlicensed AWS-3 spectrum would facilitate and enable innovation and creativity that cannot be predicted in advance—as has been universally acknowledged by engineers, carriers, and policy-makers with respect to the unlicensed 2.4 GHz band. Even with the inherent limitations of AWS-3, an unlicensed designation would begin this enabling process, not only to support current applications, but also to facilitate emergence of the applications of the future.

B. Potential of AWS-3 Spectrum for Coordinated and Base-Station Use

Different possibilities and limitations arise if the AWS-3 spectrum is licensed such that it can be operated in a “coordinated” or base-station format. Coordinated operation enables an operator to serve users over a relatively large distance (up to a few kilometers) with a single set of base-station equipment and potentially to realize the functional benefits of a carrier network. If the network is so engineered, the operator may deliver speeds of up to a few hundred Kbps—comparable to those available with existing 3G technologies such as 1xEV-DO or HSDPA. The spectrum would have operational utility comparable to the networks operating in the existing PCS spectrum or those of any single operator in the AWS-1 spectrum.

Another potential coordinated use of the spectrum is to augment existing broadband wireless services by offering shared roaming space to multiple carriers. In another potential scenario, the licensee could operate an open

⁴¹ It’s important to note, however, the emergence of other technologies for high-speed personal area networking (such as, for example, ultrawideband networking in frequencies above 3 GHz) that may, in the course of time, provide more capacity and utility for personal area networking than would AWS-3.

platform, providing capacity and network operations to multiple competing service providers connected to the operator's RF network, each of whom could offer devices for use on the network.⁴² Such a scenario would provide all the potential technical benefits of open platforms—competition, innovation, efficiency.

This level of technical competition, however, will necessitate higher capital costs than if more spectrum were available, because achieving comparable speed over less spectrum requires more sophisticated technologies, more antennas, more antenna sites, and more backhaul. As a result, AWS-3 may need costly engineering and construction to match 3G speeds operating over the greater bandwidth of PCS licenses. At 20 MHz, the AWS-3 band is approximately half the size of any individual PCS license, on which most broadband wireless technologies currently operate. It is significantly smaller than the bands operated by the 2.5 GHz licensees such as Sprint and Clearwire. AWS-3 is comparable in size to the individual AWS-1 licenses, but most AWS-1 licensees are major carriers that also have holdings in other bands—enabling them to use multiple bands to boost capacity for future broadband wireless products. The AWS-3 licensee will be at a technical disadvantage to these carriers if it does not also hold licenses for other bands to supplement AWS-3.

As a result, the AWS-3 licensee, if a new entrant, would likely have less available capacity and flexibility to offer services than many of the existing commercial providers. The licensee could compete technically—but at considerable expense—particularly in densely populated markets where significantly higher volume of radios and backhaul would be necessary to give individual users comparable speeds. In a rural area, it may be less expensive to technically compete with 3G over AWS-3, because less spectrum is required in the aggregate (since lower user density results in greater net spectrum per user).

⁴² For a detailed technical description of the operations and technical benefits of an open platform wireless network, see Columbia Telecommunications Corporation, “An Engineering Assessment of Select Technical Issues Raised in the 700 MHz Proceeding,” May 2007, <http://www.ctcnet.us/700%20band%20issues%20jsh.pdf>.